The same misfortune occurred to that man-of-war three years ago. Also on board of other men-of-war lying in the harbor of Pará, beriberi has made its appearance among the crews.

Since last report the following-named ships have been inspected and received bills of health from this office: October 4, steamship *Red Cross*, British, for Galveston. October 5, steamship *Elsie*, British, for Galveston. October 6, steamship *Galileo*, Belgian, for New York; steamship *Roman Prince*, British, for New York. October 7, steamship *Capri*, German for New York; steamship *Mohican*, British, for Galveston; bark *Rowtenburn*, British, for San Francisco. October 8, bark *Serea*, Portuguese, for Brunswick; steamphip *Menantic*, British, for Galveston.

Respectfully, yours, W. HAVELBURG, M. D.,
United States Deputy Consul-General.

Sanitary report from Rio—Yellow fever discussed.

RIO DE JANEIRO, *October 20, 1898.*

SIR: I have the honor to transmit to you the official report for the week ended October 7. There were 231 deaths from all causes, a decrease of 13 as compared with the foregoing week; 7 deaths from accesso pernicioso, a decrease of 1; 5 deaths from yellow fever, an increase of 1; 7 deaths from smallpox, an increase of 4; no death from typhoid fever, a decrease of 1; no death from whooping cough, a decrease of 2; 3 deaths from beriberi, an increase of 3, and 61 deaths from tuberculosis, an increase of 9. * * *

The smallpox epidemic, which I have reported, has not increased. The number of deaths was only 6 during the last week. There occurred some new cases. On the 16th there were 18 cases undergoing treatment at the isolation hospital. In the city and suburbs there were 11 additional cases. It may be well to remark specially that there were 2 cases in the police brigade and 3 cases among the regular troops. The character of the disease has continued mild. Of the captains, to whom the vaccination of their crew was recommended, none consented to follow the advice. Only on board of steamers with physicians have the crew and passengers been vaccinated, as I have particularly recommended. * * *

Since last report the following named ships have been inspected and received bills of health of this office: October 13, steamship *Olbers*, Belgian, for New York. October 15, steamship *Deramore*, British, for St. Lucia; steamship *Montclair*, British, for New Orleans; steamship *Kelvin*, British, for Brunswick; barkentine *Good News*, American, for Baltimore. October 17, steamship *Concordia*, French, for New Orleans. October 18, steamship *Linda*, British, for New York. October 20, steamship *Coleridge*, British, for New York.

Dr. Freire's claims in the cause and cure of yellow fever.—The subject on which I now proceed to report constitutes a disagreeable duty, since what I have to say may be regarded in a personal light, and not simply as a scientific question. I refer to the question of yellow fever and the publications made since 1882 by the former professor of organic chemistry of the faculty, Dr. Domingos Freire. In all standard works on bacteriology Dr. Freire's publications are mentioned, and it can not be denied that they have not been favorably criticised. It is not my desire to report in full the various published opinions, nor to allude to occurrences that render the question disagreeable. Moreover, Sternberg, during his scientific researches at this place, had a very disagreeable controversy.

In former reports my predecessor has sometimes mentioned Freire's prophylactical vaccinations, which, it may be stated, have produced no apparent effect in the prevention of yellow fever.

During the last few years, in which the question of the etiology of yellow fever has again attracted more than usual attention, Professor Freire has once more applied to the Government for the appointment of a committee to accertain the correctness of his assertions. In repeated communications the committee has reported very favorably on Professor Freire's ideas. The committee's last report, presented to the minister of the interior, certifies to the existence of the micrococcus xanthogenicus in the capillary vessels of the patients. By needle punctures, says the committee, the micrococcus has been found with great facility in the venous blood of the patients, and therefrom has been cultivated. Among special properties of the micrococcus it has been observed that it has two and more cilia. Inoculations of cultures of the micrococcus into animals produced pathological symptoms like those of yellow fever. Of 14 injected animals, 13 died with the following complex symptoms: Fever, injection of the conjunctivæ, photophobia, hemorrhages, bilious vomits, the characteristic vomits, anuria in some amimals, albuminuria in others.

The results of the necropsies were, vascular injection, jaundice of the peritoneum, black coagula in the heart, hemorrhagical foci, fatty degeneration of the liver, deformation of the blood corpuscles.

From this alleged resemblance between the results of the experiments and yellow fever symptoms the committee arrives at the conclusion that Professor Freire's discovery has been demonstrated.

By fractional cultures there was produced a mild form of yellow fever. Animals subjected to this treatment were thus protected from the fatal influence of injection of very virulent cultures. Moreover, the committee has made injections of such fractional cultures in 10 persons also.

It appears from the statistics of Dr. Freire that he has made 13,000 vaccinations in the states of Rio de Janeiro, Minos, Geraeo, and Sao Paulo with .3–.5 per cent mortality. Jumble, in Senegal, asserted that during the first three years of residence 75 per cent of strangers are taken ill and 66 per cent die. The committee, accordingly, accepts Dr. Freire's theory in regard to the worth of vaccinations.

No direct therapeutic experiments could be made, because no special infirmary was placed at the disposal of the committee; but from private experiments the committee considers itself authorized to regard as the best treatment of yellow fever that with salicylic acid and its combinations recommended by Freire.

If the committee, which has promulgated these opinions, is right, then the yellow fever problem has been almost completely solved. Then its etiology, prophylactics, and therapeutics have been put on an almost certain basis. Unfortunately all the practicing physicians here with whom I have spoken, and also myself, do not share that conviction.

Besides I may remark, in perfect accord with my colleagues of this place, that the members of the committee who have passed an opinion so important and so essential in its consequences, able as they may be in their special spheres of action, have never made special studies of bacteriology, as is well known, and therefore they should not feel aggrieved if their opinion should not be regarded as authoritative.

The discovery of Freire's micrococcus xanthogenicus and its peculiar culture has not been accomplished, either formerly or at present, by anyone else. It is not necessary for me to repeat this again, as it is a

fact well known and has been repeatedly published. It is possible that the alleged micrococcus is confounded with m. pyogenes aureus. To the scientific world Professor Freire has not revealed the demonstration of his micrococcus xanthogenicus. Before some scientific societies of Europe Professor Freire has made theoretic lectures, but he has not submitted the proofs of his assertions. He presented some years ago to the International Congress of Hygiene at Pesth an elaboration, which treated of the prophylactic vaccinations. As there was no opposition at that meeting, Professor Freire published and advertised his yellow-fever vaccinations as having been approved by that congress

Living in the same city as Professor Friere some years ago, and also during the last year, I have made him a visit and requested him to show me his micrococcus xanthogenicus. But this request was met with a negative.

This report is far from being agreeable to me. Here, however, principally among the public, much is said about Freire, his vaccinations, etc. It might be considered as failing in my duty if I should allow to pass in silence these facts, which are, however, rather social than scientific. But unfortunately there has resulted from Professor Friere's interference nothing that can advance to any extent the knowledge of yellow fever.

Therefore, if in this question there should not appear some new important phase, I will not again touch upon such a disagreeable question.

Sanarelli's serum in yellow fever.—Some months ago I related some facts in regard to the serum treatment of yellow fever by Sanarelli. Dr. Vitol Brazil of the bacteriological laboratory of Sao Paulo, states, that he has seen some of the patients who were treated by Sanarelli with great quantities of serum immediately after the beginning of the sickness, and who died without any alterations in the fatal symptoms. Up to the present, nothing authorizes us to say that the treatment by means of serum will prove successful. Impressed by what he has seen at Sao Carlos de Pinhal, the above-mentioned Brazilian author resolved to ascertain by experiments the effect produced by the serum on the bacillus. The serum used in these experiments was prepared by Sanarelli and placed at the disposal of the laboratory.

The yellow fever serum (serum antiamaril) added to a culture of yellow fever germ, even in a proportion of four parts to one part of culture liquid, does not prevent the development of the bacillus icteroides; what would be the results if the serum were really bactericidal? The addition of yellow fever serum, even in an insignificant quantity, one drop to 10 cubic centimeters of culture liquid to a fluid culture of the bacillus causes the bacillus icteroides to become agglutinated on the side of the tubes. Dr. Brazil had two qualities of serum of Sanarelli derived from the immunisation of two horses (A, E) and of one ox (F). The serum A represents an improper medium for the development of the bacillus icteroides, because that germ does not proliferate when inoculated in pure serum.

The bacillus icteroides in direct contact for a long time with serum A, does not suffer loss in regard to its vitality, for transplanted within another medium it develops abundantly.

The bacillus icteroide is developed abundantly in the serum F. The cultures developed in a medium, containing a large proportion of very active serum antiamaril (A and E), or those developed in pure serum F, continue virulent, killing in four or five days the rabbits which have have been inoculated with them.

Applied as a prophylactic the serum antiamaril does not prevent, at least experimentally, the development of the disease.

The serum antiamaril displays no bactericidal force, neither *in vitro* nor when applied to the treatment of animals inoculated with the bacillus icteroides, for nearly all the animals that were treated with the serum antiamaril died, and in all of them the bacillus icteroides was successfully isolated.

Criticism of serum Sanarelli.—On that question I beg to make some remarks. It is certainly very interesting to study the relations and the influence existing between a bacillus and the serum derived from the immunisation of an animal with the same bacillus. In this regard it is really surprising that those experiments have not shown a closer degree of relationship between the bacillus icteroides and the serum prepared by its means by Sanarelli.

But it is not the question. The principal question is the relation between the bacillus icteroides and the serum of blood of yellow fever patients.

If yellow fever is a sickness, in whose course we observe the effects of toxic substances and then the formation of antitoxic substances, as is observed in diphtheria and typhoid fever, then we have a right to hope that the bacillus icteroides, if it is the cause of the sickness, will be influenced by serum, prepared from blood of yellow fever patients or reconvalescents.

From 5 fatal cases of yellow fever I have obtained at periods varying from two days to one hour before death occurred a small quantity of blood, from which I have prepared serum. I have proceeded likewise in obtaining the blood in 10 cases of reconvalescents, who had undoubtedly been attacked by yellow fever, one, two and three weeks after the disappearance of the acute symptoms.

Of that serum I have mixed some drops in different proportions with fresh bouillon culture of bacillus icteroides in the manner employed in the bacteriological diagnosis of typhoid fever.

I have prepared inoculations of the bacillus icteroide in pendant drops of that serum, and have observed the preparations at medium temperature and at 37° in the culture stove.

I have observed neither the symptom of an agglutination of the bacillus, nor a disturbing influence on the development of the bacillus icteroides.

Therefore, I can express the opinion that either the bacillus icteroides is not the real cause of yellow fever, or the bacteriological rule for the formation of toxic and antitoxic substances and their special reactions on the respective bacillus does not always hold good under the conditions now scientifically recognized.

Results of studies of Sanarelli's bacillus in the State bacteriological laboratory.—Another memorandum, which treated of the yellow fever question, was presented to the Brazilian minister of the interior. This related to the experiments made in the bacteriological laboratory of the State by Dr. Alfonso Ramos, with the intention of investigating Sanarelli's discovery.

Sanarelli describes his bacillus and its cultures so, that it seems, it has such special qualities, that it will be easily possible to distinguish it from others.

I was astonished to observe that the bacillus sent me by Sanarelli has shown nothing of those particulars; neither do the colonies grow on agar in a special form, but only in round, punctiform colonies; nor could I obtain the form of a wax seal which Sanarelli considered as

characteristic. I have made some of my experiments in the bacteriological military laboratory of which Dr. Ismael da Rocha is the director. Moreover, the bacillus varies very much in its form.

All of this was also observed by Dr. Ramos and his collaborators. Dr. Ramos states that Sanarelli, on being questioned, admitted the great pleomorphism of his bacillus. Under such conditions Dr. Ramos tried to obtain the bacillus itself. It was never possible to find and to isolate the bacillus in the blood of patients. Shortly before death there were always found several kinds of microbes in the blood and liquids.

Of 38 necropsies that were made, very seldom was the bacillus icteroides successfully isolated. Unfortunately I had no suitable opportunity this year personally to make such experiments.

Dr. Sanarelli believes that the bacillus icteroides may be isolated only in 58 per cent of the cases, because its multiplication in the human body is not extensive and its virulence depends on the toxin, and, therefore, it is logical that, for the production of the disease, the influence of great quantities of bacillus is not required.

The cultures of the laboratory presented characters unlike those indicated by Sanarelli, but by comparing them with the cultures of Dr. Mendonca at Sao Paulo, and others, it was possible to demonstrate, by analogy, that they had in hand the bacillus icteroides.

My experiments have shown that the subcutaneous and abdominal injection in guinea pigs is always fatal in four to seven days, with symptoms of general infection. Injections, especially intravenous injections, have never produced the death of dogs. Sanarelli stated that he considered dogs the best animals for experimental yellow fever. I learned from private information that Sanarelli has limited this statement to dogs of superior races, and young animals. I have produced experimental infection, and the death of very young dogs and cats, but I have observed nothing that compels me to believe that the death in these experiments was caused by yellow fever. I have found general degeneration of the parenchyma of the organs, albuminuria, etc., but nothing of hemorrhages.

In the above-mentioned laboratory of the state, rabbits and dogs were subjected to the injections of cultures and toxin.

In regard to rabbits, says the director of the laboratory, the infection has an invariable type. The animal dies, when injected in the veins, two days afterwards, and four to five days after a subcutaneous injection. The symptoms which they present and the post mortem alterations are not sufficient to demonstrate the identity of the spontaneous and experimental infection.

The inoculations of dogs have been more numerous than those of rabbits; the total number was thirty.

According to the form in which the injection is made—that is, whether it is made subcutaneously or intravenously; whether the culture is injected pure or mixed with toxin, or the toxin is injected alone—the symptoms differ, notwithstanding the predominance of certain characteristic symptoms.

The subcutaneous injections do not produce positive signs of infection, perhaps because the intense local irritation promotes an efficient reaction of phagocytes, which wards off the danger.

The more or less rapid production of the different phases of the disease is a question of the size of the dose of the culture or toxin; in one instance the animal falls down, as if struck by a thunderbolt, and dies in a few hours, showing hyperthermia, vomiting, bloody diarrhea, arythmia of the heart, albuminuria, and finally anuria, accompanied or not

by convulsions; in other instances the symptoms develop slowly, and are for the most part the same as those observed in human yellow fever, including general jaundice.

The pathological anatomy was as follows: Inflammation of the mucous surface of the stomach with ecchymosis; the stomachical contents penetrated by numerous dark striæ, black vomit, hemorrhagic enteritis and cystitis, fatty degeneration of the liver, kidneys either white or lightly yellow, with hemorrhagic points; spleen almost always normal; color of the heart muscle like that of dry leaves; the right ventricle with dark coagulated blood; lungs normal.

Therefore the director of the laboratory concludes that in regard to the bacillus the etiological problem is solved by Sanarelli.

The experiments in regard to the serum were absolutely nugatory.

Cultures lose their virulence.—I may offer for consideration the following: Observations at different places have shown that the cultures of the bacillus icteroides do not retain or increase their virulence. On the contrary, they lose it. Sanarelli himself observed and acknowledged it. How is it possible, then, to immunise animals for the purpose of producing antitoxic serum, if it is not possible to obtain more toxic substances?

The acts of immunisation presume the possibility of disposing of very toxic substances, *i. e.* very virulent cultures. But in regard to the bacillus icteroides, it is a problem to be solved, since up to the present it is known that the cultures under the regular natural conditions of the laboratory lose their virulence.

Respectfully, yours, W. HAVELBURG, M. D.,
Sanitary Inspector, U. S. M. H. S.

The SUPERVISING SURGEON-GENERAL,
U. S. Marine-Hospital Service.

CUBA.

Sanitary report from Habana.

HABANA, CUBA, *November 11, 1898,*

SIR: The following report for the week ended Thursday, November 10, is respectfully submitted:

Yellow fever.—There were no deaths from yellow fever recorded during the week, although 4 cases developed among the Americans.

All of these cases developed among persons connected with the United States Army, all of whom were living in the same hotel. One of these cases was treated by me for several days at the hotel until the medical officer of the United States Commission took charge of the case and removed the patient to a hospital.

It is a significant fact that the 4 patients were the only cases at this hotel, and that they performed their official work on the bottom floor of another building.

It is my opinion that they became infected in that building and not at the hotel where there are 25 or 30 nonimmunes. * * *

The mortality in yellow fever among Americans here is beyond the limit; of the cases known to me, 12 in number, there have been 7 deaths and 2 cases under treatment.

It is beyond a shadow of a doubt that if these patients had been under the care of experienced physicians, trained nurses, and in a well-equipped hospital the mortality would have been less.

Malarial fevers.—The deaths from these fevers have increased over